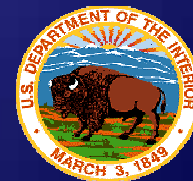


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October 1 2008



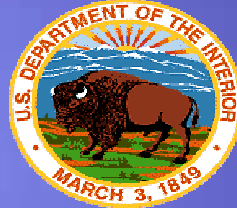
Using Adaptive Management in Habitat Conservation Plans



Overview

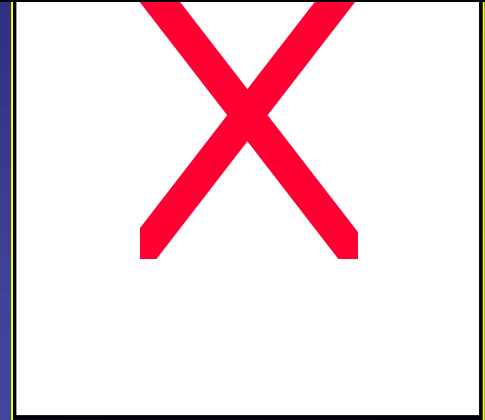
- Habitat Conservation Plan (HCP) Background
- Adaptive Management (AM) Background
- Use of Adaptive Management in HCPs
- Costs and benefits of correctly implemented Adaptive Management in an HCP

Endangered Species Act of 1973



- Prohibits the "take" of any listed species: "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect" any listed species.
- "Harm" may include habitat modification that injures a species.
- 1982 amendment allows "incidental" take of species when Incidental Take Permit is obtained from USFWS.
- An "incidental take" occurs during course of otherwise lawful activities.
- 10(a)(1)(B) Incidental Take Permit; must be based on an approved Habitat Conservation Plan.

ESA – Habitat Conservation Plans



- Clear regulatory mechanism to permit incidental take of ESA listed species by private interests during lawful land, water, and ocean use activities.
- Congress also intended:
 - ↑ Process to reduce conflicts between listed species and economic development.
 - ↑ Provide framework for encouraging creative partnerships between public and private sectors and state, municipal, and Federal agencies in the interest of conservation.
 - ↑ Not just a procedure, but a PROCESS to resolve conflicts and create a climate of partnership and cooperation.

HCP History



→ San Bruno Mountain

- ↑ San Francisco Bay area 1970s.
- ↑ Residential development on private land.
- ↑ Endangered Mission Blue and San Bruno Elfin butterflies.
- ↑ No capacity for compromise in the ESA for otherwise lawful activities on private land.
- ↑ No way to deal with development of private land.

HCP History cont.



- San Mateo County and Visitacion Associates.
- 1983 – San Bruno Mountain HCP.
- 800 acres developed, 1,700 conserved with native grasslands restoration with nonnative plant removal.
- Holling 1978 – Birth of Adaptive Management.
- Meadows (1995) – Lacked well-defined master plan, no ongoing monitoring. "I've gotten the feeling that it's all too easy to create all these HCPs and act as if the job is done. But if we don't check on them, we won't know how well they're working," John Randall TNC.
- Lack of built in long-term monitoring of grasslands: no way to evaluate success or utilized adaptive management.
- Revised monitoring to map extent of nonnative and native grassland.

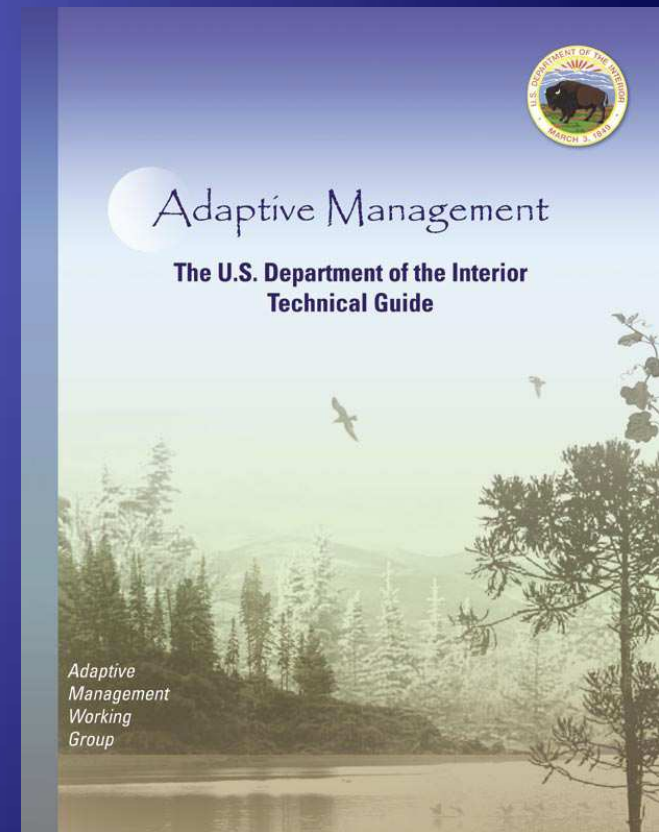
HCP History cont.



- FWS recognized that San Bruno was just one example.
- FWS 1985 published final regulations, policy of “flexibility and ingenuity”. HCP should include the basic standards of good science but creativity is encouraged.
- FWS 1996 HCP Handbook included section on Adaptive Management.
- FWS 2000 Addendum Five Point Policy for HCPs includes: 1) Biological Goals and Objectives; 2) **Adaptive Management**; 3) Monitoring; 4) Permit Duration; and 5) Public Participation.
 - ↑ No surprises? Should clearly state the range of possible operating conservation program adjustments due to significant new information, risk, or uncertainty, defining limits of resource commitments to assess the potential economic impacts of adjustments before agreeing to the HCP.

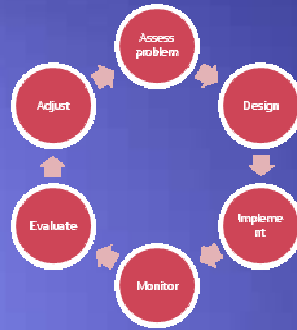
Adaptive Management 2007 Department of Interior Guide

- Stakeholder Involvement
- Management Objectives
- Management Alternatives
- Predictive Models
- Monitoring Plans
- Decision Making
- Monitoring Responses to Management
- Assessment
- Adjustment to Management Actions



Adaptive Management

- “Few concepts in environmental management are both as widely promoted and as widely misunderstood as adaptive management” (Gregory et al. 2006).
- Learning by doing - but many interpretations of what this means, as a result Adaptive Management has little meaning (Gregory et al. 2006); often just **contingency planning** in HCPs .
- Adaptive management is a systematic approach for improving resource management by learning from management outcomes (Williams et al. 2007).
- Structured decision making process for addressing and embracing scientific uncertainty.
- Some kind of decision to be made, must be able to change the decision later in time.
- Embraces uncertainty, acknowledges risk, and values information.



Adaptive Management

- **Passive Adaptive Management** – information obtained is used to determine a single best course of action.
- **Active Adaptive Management** - developing and testing a range of alternative strategies (both from Walters and Holling 1990).

Adaptive Management Stakeholder Involvement



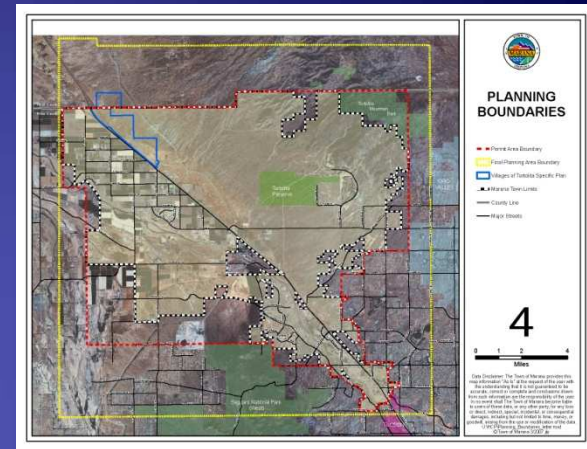
- An adaptive approach actively engages stakeholders in all phases of a project over its timeframe, facilitating mutual learning and reinforcing the commitment to learning-based management.
- Many HCPs are long-term, and require long-term commitment to engaging stakeholders for the term of the HCP.

Adaptive Management Institutional Support



- “Any environmental management plan is only as good as the capacity of the implementing institution to deliver on its promises” (Gregory et al. 2006).
- For HCPs, a long-term commitment to institutional leadership is critical to success to organize stakeholder input and adjust management based on new information.

Management Objectives



- 1) Facilitating compliance with the Endangered Species Act for planned urban development and capital improvement projects
- 2) Promoting achievement of regional economic objectives including the orderly and efficient development of certain lands, while recognizing property rights and legal and physical land use constraints; and
- 3) Complementing other regional conservation planning efforts such as Pima County's Sonoran Desert Conservation Plan and the City of Tucson's HCP project.

Management Objectives



Goals and Objectives for the Burrowing Owl

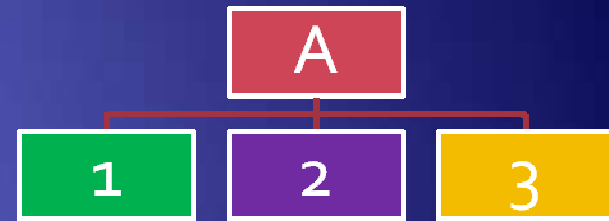
Goal:

1. Contribute to maintaining local and regional populations of burrowing owls.

Specific Objectives:

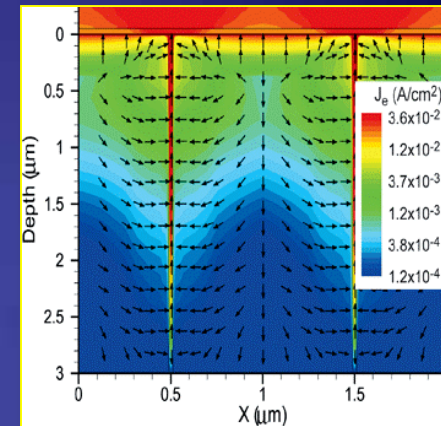
1. Provide breeding and foraging opportunities for burrowing owls. **What constitutes good habitat?**
2. Provide for long-term availability of suitable dispersal habitat for burrowing owls. **What is suitable dispersal habitat?**
3. Minimize potential mortality of burrowing owls resulting from City actions. **Number of breeding areas? Proximity to homes?**

Management Alternatives



- Define the suite of management actions to be considered for implementation.
- Active vs. Passive.
- Definition of management alternatives should promote learning.
- Stakeholder Driven.

Modeling



- Characterize system behaviors and responses to management actions.
- Incorporate different hypotheses about how the resource system works and responds to management.
- The suite of models should capture key uncertainties about resource and management effects.
- Calibrated to available data.

Burrowing Owl Management Areas



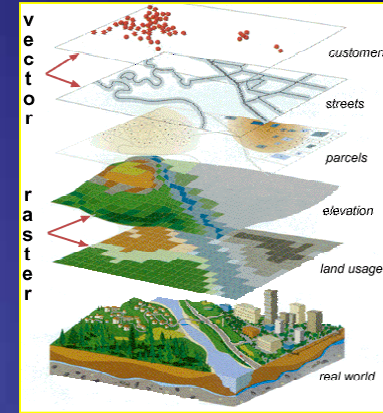
- What are the genetic considerations?
 - ↑ Minimum viable population size
 - ↑ Effective population size
 - ↑ Metapopulation dynamics, gene flow
- What attributes constitute good nesting habitat?
 - ↑ Proximity to population centers
 - ↑ Soils
 - ↑ Food base
 - ↑ Drought effects?
- What attributes constitute good movement corridors for burrowing owls?
 - ↑ Proximity to roads
 - ↑ Housing density
- Use spatial design support systems to test reserve size and location.

Monitoring



- Objective-based – What questions are you trying to answer?
- Define: 1) variables to monitored, 2) frequency, 3) timing, and 4) duration.
- Define how data are analyzed.
- Needs to be sufficient to detect species trend.
- Funding and responsible party must be identified.

Assessment

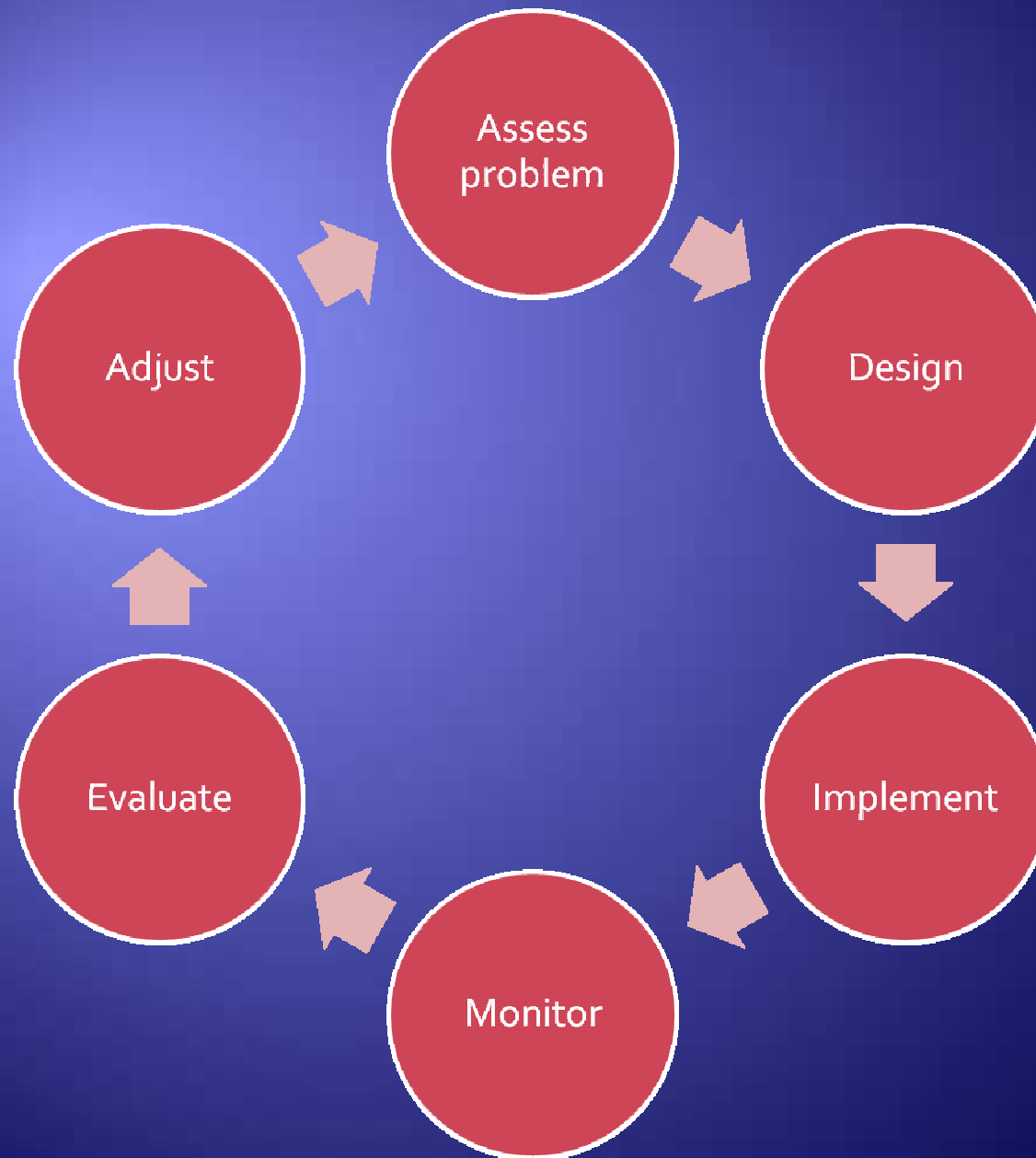


- Compare contrasting treatments (Active AM) or single treatment (Passive AM) to model predictions.
- Should be adequate to determine management impacts.
- Use to evaluate management effectiveness.
- Must identify and evaluate other environmental factors (e.g. climate change, new nonnative species, collapse of world financial markets).

Iteration



U.S. Fish & Wildlife Service



Public Process

- People and political processes are central features of adaptive approaches to land management” and... “Citizen-agency interactions are more effective when (1) they are open and inclusive, (2) they are built on skilled leadership and interactive forums, (3) they include innovative and flexible methods, (4) involvement is early and continuous, (5) efforts result in action, and (6) they seek to build trust among participants.” (Shindler and Cheek 1999).
- HCP public comment period.
- However, for large-scale, regional, or exceptionally complex HCPs, the Services are increasingly encouraging applicants to use informational meetings and/or advisory committees.
- Institutionalize public-input component by making HCP meetings open to the public for the life of the permit.

Adaptive Management in HCPs

- ↑ Both address long-term planning with significant environmental uncertainty.
- ↑ Both rely on detailed monitoring plans.
- ↑ Both need well-defined organizational structure.
- ↑ Both function better with public involvement.
- ↑ Similarities with Other Applications – e.g. Comprehensive Everglades Restoration Plan, Glen Canyon Dam Adaptive Management Program, Chiricahua Leopard Frog Recovery Plan.

HCP and AM

A process



- Development – Design AM program framework.
- Permit Processing – Meet requirements defined by FWS.
- Post issuance – Implement AM program framework; utilizing the structure used in developing the HCP.
- With Adaptive Management, the HCP is not an end to itself! The real value is in its implementation as a program.

An Adaptive HCP Model

- Institutional structure identified
 - ↑ Technical Advisory Committee and Stakeholders Advisory Committee.
 - ↑ Meet periodically, public invited for the duration of the HCP.
 - ↑ Institutional Framework - Roberts Rules or similar – How will you make decisions.
 - ↑ Roles and Responsibilities clearly defined (e.g. monitoring, modeling, data storage, leadership).
- Long-term Funding Identified
 - ↑ Spread cost between agencies/stakeholders.
 - ↑ Absorb as much cost as possible with in-kind services.
 - ↑ Cost share as much as possible for overlapping responsibilities.
 - ↑ Requirement for HCPs.
- Commitment to long-term implementation of true AM
 - ↑ AM planning throughout process, throughout duration of HCP.

Costs

- Monitoring.
- Research and model development.
- Organizational Structure.
- Logistics
- Data storage.
- Burden/overhead.
- Risk of becoming “trapped in an apparently endless process of model development and refinement” (Walters 1997).



Benefits

- Learning.
- Information - is the value of information high?
- Better decision making.
- Better defined process of HCP implementation.
- Better able to deal with Changed Circumstances (e.g. Climate Change).
- Better chance for HCP success.



Conclusions

- Adaptive Management is not trial by error, or even contingency planning, but a systematic approach for improving resource management by learning from management outcomes .
- Adaptive Management requires:
 - ↑ Acknowledgement of uncertainty.
 - ↑ A long-term commitment to learning.
 - ↑ The participation of stakeholders.
- Because they seek to address the uncertainty between economic development and ecological conservation, often over long time periods, HCPs can benefit from Adaptive Management.
- Not using Adaptive Management can be more costly in the long run in lost resources and lack of learning and understanding.
- For an Adaptive Management HCP to be successful:
 - ↑ HCP parties need to have a common definition of “changed circumstances” and the range of management actions considered;
 - ↑ A long-term commitment to learning with a well-defined institutional stakeholder-driven framework over the life of the HCP.

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